

## **Draft Amendment to the Recovery Plan for Virgin River chub**

[https://ecos.fws.gov/docs/recovery\\_plan/950419a.pdf](https://ecos.fws.gov/docs/recovery_plan/950419a.pdf)

Original Approved: April 19, 1995

Original Prepared by: Region 6, U.S. Fish and Wildlife Service

Date of Draft Amendment: November 2018

Species addressed in Draft Amendment: Virgin River chub (*Gila seminuda*)

We have identified information that indicates the need to add recovery criteria for the Virgin River chub (*Gila seminuda*) recovery plan. The species' 1995 recovery plan did not identify recovery criteria for delisting the Virgin River chub. In this proposed modification, we identify the delisting recovery criteria, and present the rationale supporting the proposed recovery plan modification. The proposed modification is attached as an appendix to the existing recovery plan, superseding only the Interim Delisting Criteria section (page 18) of the recovery plan (USFWS 1995).

### **BACKGROUND INFORMATION**

Recovery plans should be consulted frequently, used to initiate recovery activities, and updated as needed. A review of the recovery plan and its implementation may show that the plan is out of date or its usefulness is limited, and therefore warrants modification. Keeping recovery plans current ensures that the species benefits through timely, partner-coordinated implementation based on the best available information. The need for, and extent of, plan modifications will vary considerably among plans. Maintaining a useful and current recovery plan depends on the scope and complexity of the initial plan, the structure of the document, and the involvement of stakeholders.

An amendment involves a substantial rewrite of a portion of a recovery plan that changes any of the statutory elements. The need for an amendment may be triggered when, among other possibilities: (1) the current recovery plan is out of compliance with regard to statutory requirements; (2) new information has been identified, such as population-level threats to the species or previously unknown life history traits, that necessitates new or refined recovery actions and/or criteria; or (3) the current recovery plan is not achieving its objectives. The amendment replaces only that specific portion of the recovery plan, supplementing the existing recovery plan, but not completely replacing it. An amendment may be appropriate in cases where significant plan improvements are needed, but resources are too scarce to accomplish a full recovery plan revision in a short time.

Although it would be inappropriate for an amendment to include changes in the recovery plan that contradict the approved recovery plan, it could incorporate study findings that enhance the scientific basis of the plan, or that reduce uncertainties as to the life history, threats, or species' response to management. An amendment could serve a critical function while awaiting a more comprehensive revised recovery plan by: (1) refining and/or prioritizing recovery actions that need to be emphasized, (2) refining recovery criteria, or (3) adding a species to a multispecies or

ecosystem plan. An amendment can efficiently balance resources spent on modifying a plan against those spent on managing implementation of ongoing recovery actions.

## **REASON FOR AMENDMENT**

In the 1995 recovery plan (USFWS 1995), we included downlisting criteria for Virgin River chub. However, we did not incorporate Virgin River chub recovery (delisting) criteria into the plan due to a lack of information on population status and species life history at the time we signed the recovery plan. Through this amendment, we are adding quantifiable recovery criteria for Virgin River chub. Quantifiable recovery criteria are necessary to determine when we have met the recovery goals for Virgin River chub and can consider delisting the species.

## **METHODOLOGY USED TO COMPLETE THE RECOVERY PLAN AMENDMENT**

This draft of updated recovery criteria was developed in concert with the Utah Division of Wildlife Resources, the Utah Department of Natural Resources, and the Virgin River Program. These draft recovery criteria were also reviewed by biologists at the U.S. Fish and Wildlife Service Arizona and Nevada Ecological Services Field Offices, and the states of Arizona and Nevada. All comments were considered and incorporated into the recovery criteria for Virgin River chub.

Peer review of the proposed recovery criteria will be concurrent with the public review and comment period on the draft amendment, and comments received will be incorporated into the final recovery plan amendment.

## **ADEQUACY OF RECOVERY CRITERIA**

Section 4(f)(1)(B)(ii) of the Endangered Species Act (ESA) requires that each recovery plan shall incorporate, to the maximum extent practicable, “objective, measurable criteria which, when met, would result in a determination...that the species be removed from the list.” Legal challenges to recovery plans (see *Fund for Animals v. Babbitt*, 903 F. Supp. 96 (D.D.C. 1995)) and a Government Accountability Audit (GAO 2006) also have affirmed the need to frame recovery criteria in terms of threats assessed under the five listing factors.

### **Current Downlisting Criteria**

The primary objective of the downlisting criteria is to address major stressors to Virgin River chub survival (USFWS 1995). A secondary objective is to initiate conservation and recovery measures that may lead to the downlisting to threatened status (USFWS 2008a). Current downlisting criteria from the 1995 Recovery Plan are as follows:

1. Virgin River flows essential to the survival of all life stages of Virgin River chub are ensured. This will include development and implementation of operational criteria for existing dams, reservoirs, and diversions that provide for flows sufficient to sustain all life stages near historic levels of abundance; acquisition of priority water rights to ensure

instream flows of sufficient water quality and quantity from La Verkin Springs (also known as Pah Tempe Springs and Dixie Hot Springs) downstream to Lake Mead to ensure the species' survival; and agreements to ensure passage, timing, and magnitude of flows necessary for channel maintenance during appropriate periods of the year.

2. Degraded Virgin River habitats from La Verkin Springs to Lake Mead are improved and maintained to allow continued existence of all life stages at viable population levels.
3. Barriers to upstream movements of introduced fishes are established, and red shiner and other non-native species that present a major threat to the continued existence of the native fish community are eliminated upstream of those barriers.

## Synthesis

The Virgin River chub is imperiled in the Virgin River. The spatial distribution of the Virgin River chub has changed little since it was listed in 1990 with populations occurring in two core areas of the Virgin River (above Washington Fields Diversion in Utah, and near the confluence with Beaver Dam Wash in Arizona). Causes for declines in Virgin River chub populations can be attributed to a number of environmental conditions. One cause of population decline identified in the 1995 Recovery Plan is low instream flows resulting from water development and drought. Since the late 1800's, water development along the Virgin River has reduced instream flows throughout much of Virgin River chub's historic range (USFWS 2008a). In recent years, drought has impacted instream flows in the river and also contributed to declines in chub populations (USFWS 2008a).

Additional information since the development of the 1995 Recovery Plan shows that low instream flows affect summer water temperatures in the Virgin river. Low flows in the river have increased temperatures to a level where they exceed Virgin River chub behavioral thermal maximum thresholds (the point where feeding, breeding, or sheltering behavior is altered) (Fridell and Morvilius 2005) and critical thermal maximum thresholds (the point where chubs experience a loss of equilibrium and often die) (Deacon *et al.* 1987). Another ancillary effect of low instream flows on Virgin River chub populations is habitat alteration. Reduced flows and the establishment of tamarisk and other non-native riparian vegetation have reduced the amount of pool habitats, which are the preferred habitat for Virgin River chub (USFWS 2008a).

One of the other major impacts to Virgin River chub numbers is predation and competition by nonnative fishes, in particular red shiner (*Cyprinella lutrensis*) (USFWS 1995). Through a series of nonnative fish control efforts, red shiner were eradicated in the Virgin River in Utah, but still occur in large numbers in Arizona and Nevada (USFWS 2017). One concern with non-native fish control efforts is the use of fish barriers to isolate stream reaches and prevent upstream fish migration. While fish barriers prevent upstream nonnative fish movement, they also reduce genetic diversity by preventing Virgin River chub subpopulations in the upper and lower basin from exchanging genetic material (USFWS 2008b). In response, we recommended periodic relocation of chub from the lower basin to the upper basin to maintain genetic fitness (USFWS 2008b).

Another limiting factor identified in the 1995 Recovery Plan is episodic low dissolved oxygen conditions in the river, often caused by runoff from burned portions of the drainage. In 2007, the Utah Division of Wildlife Resource (UDWR) monitored Virgin River chub populations in the Virgin River. Their efforts determined Virgin River chub abundance declined by over 90 percent between 2006 and 2007 in the upper Virgin River (UDWR 2012). Data suggested that low dissolved oxygen caused by runoff from wildfire burn scars during two late summer 2007 storm events decimated the native fish population between La Verkin Hot Springs and Washington Fields Diversion. These events significantly reduced Virgin River chub populations in this stretch of the Virgin River. For several years after those events, we stocked Virgin River chub in this stretch of the river and populations have since rebounded and maintained stable population levels (UDWR 2012).

## **AMENDED RECOVERY CRITERIA**

Recovery criteria serve as objective, measurable guidelines to assist in determining when an endangered species has recovered to the point that it may be downlisted to threatened, or that the protections afforded by the ESA are no longer necessary and a listed species may be delisted. Delisting is the removal of a species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Downlisting is the reclassification of a species from endangered to threatened. The term “endangered species” means any species (species, subspecies, or distinct population segment) that is in danger of extinction throughout all or a significant portion of its range. The term “threatened species” means any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

The recovery criterion presented below represent our best assessment of the conditions that would most likely result in a determination that delisting of Virgin River chub is warranted as the outcome of a formal five-factor analysis in a subsequent regulatory rulemaking. Achieving the prescribed recovery criteria is an indication that the species is no longer threatened or endangered, but this must be confirmed by a thorough analysis of the five listing factors. All downlisting criteria from the previous plan were reviewed and found to be adequate. The downlisting criteria address the need for the persistence of resilient, redundant, and representative subpopulations across the range, as well as reducing threats and increasing regulatory certainty. Below, we provide recovery criteria for Virgin River chub that were not included in the 1995 Recovery Plan. Virgin River chub will be considered for delisting when all of the downlisting criteria have been met, in addition to the following recovery criteria:

1. A Conservation Agreement (CA) has been developed and implemented for Virgin River chub that addresses all five listing factors in the Virgin River basin. The CA will help maintain instream flows in the Virgin River while also addressing the ancillary effects of higher water temperatures and reduced habitat availability. The CA will also address efforts to reduce or remove non-native fish, such as red shiner and maintain genetic diversity between the upper and lower basin. The CA will keep the species relevant in decision making, provide regulatory certainty, and will keep the species from being relisted under the Act.

2. A self-sustaining population of adult Virgin River chub with a lambda (rate of growth) greater than or equal to 1 is achieved and maintained within each of the upper and lower Virgin River Basin (sub-populations) for five out of seven years as determined by a population viability analysis. In this context, a self-sustaining population is described as a population that results in sufficient recruitment of naturally produced Virgin River chub into the adult population at levels necessary to maintain a wild adult population in the absence of artificial population augmentation.

Any classification decision will consider an analysis of the following five factors: (1) is there a present or threatened destruction, modification, or curtailment of the species' habitat or range; (2) is the species subject to overutilization for commercial, recreational, scientific, or educational purposes; (3) is disease or predation a limiting factor; (4) are there inadequate existing regulatory mechanisms in place outside the ESA (taking into account the efforts by states and other organizations to protect the species or habitat); and (5) are other natural or manmade factors affecting its continued existence. When delisting or downlisting a species, we first propose the action in the Federal Register and seek public comment and peer review of our analysis. Our final decision is announced in the Federal Register.

### **Rationale for Amended Recovery Criteria**

The proposed recovery criteria is based upon the most up-to-date information about the species' biology, limiting factors, and expert opinion. The proposed recovery criteria also addresses the three R's (redundancy, representation, and resiliency).

The proposed recovery criteria addresses both redundancy and resiliency by addressing the need for self-sustaining sub-populations of Virgin River chub in the mainstem Virgin River. By having self-sustaining sub-populations in both the upper and lower Virgin River, Virgin River chub would be able to persist in one or more locations in the event of a catastrophic or stochastic event. In addition, the proposed recovery criteria addresses representation of the species. By having self-sustaining sub-populations in the upper and lower basin, Virgin River chub would encompass much of its historic range. Currently, Virgin River chub from the upper basin drift downstream to the lower basin and by maintaining self-sustaining sub-populations in both reaches, the downstream connection of both sub-populations would maintain the existing genetic diversity in the lower basin. There is concern that the use of fish barriers prevents upstream migration of Virgin River chub (and thus exchange of genetic material), but recent information suggests that the upper basin sub-population contains adequate genetic diversity for persistence (USFWS 2008b) as long as there is regular relocation of chub from the lower basin to the upper basin. The Virgin River Program has committed to periodic relocation of chub from the lower basin to the upper basin to maintain genetic diversity. In addition, the on-going threat of non-native fish recolonization from the lower basin and Lake Mead is too great to remove the fish barriers that inhibit upstream movement.

The proposed recovery criteria also either directly or indirectly address the five factors identified in the section above. Increasing Virgin River chub populations (lambda greater than 1 for five out of seven years) in both the upper and lower Virgin River requires addressing low instream flows and the related effects of increased water temperatures and reduced habitat availability

(Factor 1). In years where annual stream flows were higher (2005 and 2010), Virgin River chub populations increased in most areas (USFWS 2008a) (UDWR 2012).

Factor 2 (overutilization) is not considered a threat to Virgin River chub (USFWS 2008a). The impact of predation and competition by non-native fishes (Factor 3) will have to be addressed to achieve the recovery criteria. Multiple studies in the basin have shown that the reduction or elimination of red shiner have increased recruitment of Virgin River chub. In the upper basin where red shiner have been eradicated, reproduction and the presence of age-0 and age-1 fish is a common annual occurrence, whereas in the lower basin, reproduction and the presence of age-0 and age-1 fish is rare (USFWS 2008a).

The development of a CA as part of the recovery criteria would address the need for regulatory certainty (Factor 4) and the conservation strategy associated with a CA would include adaptive management to allow for the flexibility to address new or modified stressors that affect Virgin River chub populations (Factor 5).

## LITERATURE CITED

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